

Comments on Docket Number FAA-2000-8017

(from GKN Westland Helicopters Ltd, England)

1. In principle, the stated aim of introducing a method to reduce the risk of life-limited parts being used beyond their life limits is supported.
2. Some of the methodology proposed in the docket is flawed, and consideration should be given to the practical problems associated with marking a component with its life status, as highlighted by the following points.
 - 2.1 If component marking is to carry out its desired function, then any method of marking life status onto a component would need to be both robust and indelible. This could adversely affect the life status it is seeking to record, if it is not properly controlled. Without proper control of the marking process, it could introduce more problems than it would help to avoid. On metallic parts there is the risk of degrading fatigue strength very significantly, particularly when the part marking is conducted by someone other than the original equipment manufacturer. On composite parts, indelible marking is problematic – paint is favoured, which is easily corrupted.
 - 2.2 An aircraft may achieve Type Certification with an initial fatigue life declared for some of its components, and indeed the aircraft may be delivered to a customer in this state. Subsequently, with the completion of more onerous testing, or further calculations, sufficient qualification evidence may exist to extend the fatigue life of these components. The components in the customer's aircraft will not have changed, but the newly-enhanced fatigue lives will apply to them as well.
 - 2.3 It may also be that, for example, due to a customer wishing to use an aircraft for more onerous tasks than were originally anticipated during its design, the fatigue lives of some of its components may have to be reduced. These lives would therefore be lower than the ones to which the aircraft was originally delivered. Again, the actual components in the customer's aircraft will not have changed, but the newly-degraded fatigue lives will apply to them as well.
 - 2.4 There are also proposals to introduce usage monitoring for some types of components. In other words, the actual life of the component would depend upon the use to which it was put. In such cases, the life remaining in the component would result from a calculation that would take into account a variety of factors that would define the severity of use of the component. In such cases, the remaining life would be calculated by a Usage Monitoring System.
 - 2.5 An aircraft itself may be released to service with a finite airframe fatigue life, say 20000 hours. As a result, any components having a higher fatigue life than this would be identified as having an "unlimited" life. If the airframe fatigue life were subsequently to be extended, some of the formerly "unlimited" components would now need to have a finite fatigue life applied to them.
 - 2.6 Some aircraft variants, with different usage, use common components to which different lives are attributable for each variant. In such cases, components may be pooled by the operator(s) or the manufacturer and may therefore be transferred from one variant to another. In this instance, lives are pro-rated to take account of percentage life consumed and therefore effective life consumed/remaining for the specific variant. This is commonly used for military variants which may then subsequently enter the civil market (or vice versa) at aircraft or component level eg Lynx/W30 Sea King/H-3/S-61 etc.
3. For the reasons noted in 2 above, it is suggested that, with a few exceptions, marking a part with its fatigue life is not a practical proposition. Reliance should be placed upon segregation of life-limited components and the use of a robust life monitoring procedure. Control of life consumed on part marked, serialised components should be controlled through validated traceable log card entries and legislation should ensure that lack of, or falsified log cards should render a part unusable. Unique (coded?) marking of a part could be used for matching and validating the relevant log card.
4. However, marking a part to indicate the retirement of that part from service, or otherwise rendering it unusable is good engineering practice, and is to be recommended. In principle, there should be no reason not to apply this aspect of the rule to life-limited parts that have been removed from service prior to the effective date of this rule.